WHAT IS CLAIMED IS:

1. An image processing apparatus, comprising:

an edge image forming unit extracting an edge from an input image to form an edge image;

an edge smoothed image forming unit smoothing said edge image to form an edge smoothed image;

a difference calculating unit calculating a difference between said edge image and said edge smoothed image; and

a binarizing unit binarizing said edge image based on said difference.

2. The image processing apparatus according to claim 1, wherein

said edge smoothed image forming unit smoothes said edge image using an average filter of 5 pixels × 5 pixels to 11 pixels × 11 pixels.

3. The image processing apparatus according to claim 1, wherein

said input image is a gray scale image; and

said edge image forming unit extracts an edge from said gray scale image to form said edge image.

4. The image processing apparatus according to claim 1, wherein

said input image is an image obtained by transforming a color image to a gray scale image; and

said edge image forming unit extracts an edge from said image obtained by transforming said color image to said gray scale image to form said edge image.

5. The image processing apparatus according to claim 1, wherein

said input image is a color image; and

said edge image forming unit extracts an edge from at least one plane of said color image to form said edge image.

6. A program product for realizing image processing executed by a

computer, comprising:

edge smoothed image forming step of forming an edge smoothed image by smoothing an edge image formed based on an input image;

difference calculating step of calculating a difference between said edge image and said edge smoothed image; and

binarizing step of binarizing said edge image based on said difference.

7. The image processing program product according to claim 6, wherein

in said edge smoothed image forming step, said edge image is smoothed by using an average filter of 5 pixels × 5 pixels to 11 pixels × 11 pixels.

8. The image processing program product according to claim 6, wherein

said input image is a gray scale image; and

in said edge smoothed image forming step, said edge smoothed image is formed by smoothing an edge image formed based on said gray scale image.

9. The image processing program product according to claim 6, wherein

said input image is an image obtained by transforming a color image to a gray scale image; and

in said edge smoothed image forming step, said edge smoothed image is formed by smoothing an edge image formed based on said image obtained by transforming said color image to said gray scale image.

10. The image processing program product according to claim 6, wherein

said image is a color image; and

in said edge smoothed image forming step, said edge smoothed image

is formed by smoothing an edge image formed by extracting an edge in at least one plane of said color image.

11. An image pick-up apparatus, comprising:

an image pick-up unit picking-up an image of an object and capturing an object image;

an edge image forming unit forming an edge image by extracting an edge from said object image;

an edge smoothed image forming unit smoothing said edge image to form an edge smoothed image;

a difference calculating unit calculating a difference between said edge image and said edge smoothed image; and

a binarizing unit binarizing said edge image based on said difference.

12. The image pick-up apparatus according to claim 11, wherein

said edge smoothed image forming unit smoothes said edge image using an average filter of 5 pixels × 5 pixels to 11 pixels × 11 pixels.

13. The image pick-up apparatus according to claim 11, wherein

said image pick-up unit captures said object image that is a gray scale image.

14. The image pick-up apparatus according to claim 11, wherein

said image pick-up unit captures said object image that is a color image; and

said edge image forming unit extracts an edge from an image obtained by transforming said object image that is a color image to a gray scale image, to form said edge image.

15. The image pick-up apparatus according to claim 11, wherein

said image pick-up unit captures said object image that is a color image; and

said edge image forming unit extracts an edge from at least one

plane of said object image that is a color image, to form said edge image.

16. The image pick-up apparatus according to claim 11, wherein said image pick-up unit, said edge image forming unit, said edge smoothed image forming unit, said difference calculating unit and said binarizing unit are integrated.